UNDERGRADUATE SUMMER VACATION SCHOLARSHIP AWARDS – FINAL SUMMARY REPORT FORM 2016/17

Name of student:

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Project Title: (no more than 220 characters)

Anatomical Diversity of Skin: Positional Variation in Wound Healing Properties

Brief Resume of your Project's outcomes:

Skin on different parts of the body is diverse, from the hairy skin on our scalp, to the strong but sensitive skin on the palms of our hands. Interestingly, different parts of the body heal with varying speed and quality, but we don't yet understand why. This project began to test the hypothesis that different body have variable wound healing qualities due to the fact that they arise from different embryonic tissues during development. We used a mouse model of wound repair to systematically investigate how healing differs across sites, with respect to morphology, histology and gene expression. Five anatomical sites were investigated: face, back, abdomen, and upper and lower limbs (Figure 1).

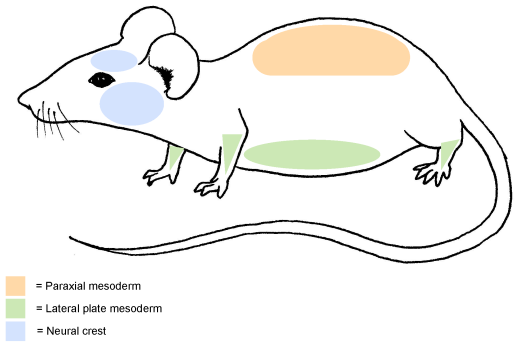

Figure 1. Developmental origins of skin from cheek, back, abdomen, upper limb and lower limb on a mouse model.

It was concluded that after three days of healing, there was distinction in the size, shape, orientation, and surface topography of the wounds corresponding to the site. Histological stainings showed great variation in cellular density, matrix collagen, and vascularity (particularly high cellularity in back and abundant revascularization in abdomen). Gene expression values indicated wound-induced HoxB6, which was unique to lower limb wounds, and there was a surprising fluctuation of TGFb1 in wounded tissue when compared to normal skin.

With this summer studentship, we have achieved our objective to compare the regional properties of skin in the context of wound healing, investigating the functional implications of the differences at these sites. The progress we have made here, and the invaluable samples we have collected and will continue to analyze moving forward, serve as progress in the understanding of connective tissue repair and scarring across anatomical sites.